Thesis/
Reports
WALSH

FINAL

Potable Water System Microscopic Particulate Analysis

Spring Creek Campground

Salmon-Challis National Forest

Walsh Project Number: 6137-010

06/13/2005

Property of
National FS Library
USDA Forest Service
240 W Prospect Rd
Fort Collins CO 80526

Walsh
Environmental Scientists and Engineers, LLC

Walsh
Environmental Scientists and Engineers, LLC

FINAL
Potable Water System Microscopic Particulate Analysis

Spring Creek Campground
Salmon-Challis National Forest

06/13/2005

Prepared For: USDA Forest Service Region 4

Prepared By: Z. Ross
Zane Ross

A. Walsh
Anne Walsh

Reviewed By: Allison A Haines
Allison Haines

Submitted by
WALSH ENVIRONMENTAL SCIENTISTS AND ENGINEERS, LLC
4888 Pearl East Circle, Suite 108
Boulder, Colorado 80301
(303) 443-3282

WALSH Project Number: 6137-010

MICROSCOPIC PARTICULATE ANALYSIS OF A DRINKING WATER SYSTEM

Water System Name: Spring Creek Campground

District: North Fork Forest: Salmon-Challis

Drinking Water System I.D. Number: 0001.000017

Date of MPA: 06/13/2005

INDEX

A. Site Identification
B. System Description
C. Groundwater Under the Direct Influence of Surface Water (GWUDI) Evaluation.
D. Potential Sources of Contamination
E. Microscopic Particulate Analysis (MPA) Sampling Event
F. Attachments

A. Site Identification

1. District:	North Fork
2. Water System Name:	Spring Creek Campground
3. Forest:	Salmon-Challis
4. Water System I.D. Number:	0001.000017
5: Date of MPA:	06/13/2005
6. MPA Performed By:	Zane Ross
	Anne Walsh
7. Date of this Report:	06/13/2005
8. Report Reviewed By:	Allison Haines

Reviewed By: _____

District Ranger Date

Reviewed By: _____

Recreation Staff Date

Reviewed By: _____

Forest Engineer Date

B. System Description

The Spring Creek Campground is a seasonal parking lot, boat ramp and campground open from April to November. The campground is served by a transient, non-community (TNC) water system consisting of a drilled well and a handpump. Spring Creek Campground is located approximately 12 miles west of North Fork, Idaho, just off Forest Road 030.

The 7-inch diameter steel well of a depth of 102 feet and unknown capacity is located west of the entrance. Static water level has been measured at 20 feet below ground surface. The well casing extends approximately 18 inches above natural grade. It is surrounded by a concrete slab in good condition with a trough, which allows for drainage of excess water away from the well.

The single point of use consists of a handpump installed on the well casing which appears to be in satisfactory condition. There is a shroud installed and it is securely attached to the well. There is a screened vent on the drinking fountain reservoir; however, it is unknown whether this vents the well. The handpump is rusted in areas and should be repainted. There is no permanent "no washing/ no bathing" sign installed at the well.

The potential sources of contamination include: the Salmon River located approximately 160 feet south and down gradient from the well, Spring Creek located approximately 100 feet northwest and cross gradient of the well and a vault toilet located approximately 115 feet north and cross gradient from the well.

There were no use records, system construction information, or a site-sampling plan available for review at the time of the site survey. There were no bacteriological, chemical, physical, nitrate/nitrite, or previous microscopic particulate analysis (MPA) test results provided for review; however, the forest service reports a history of poor water tests at this site.

C. Groundwater Under the Direct Influence of Surface Water (GWUDI) Evaluation

An Environmental Protection Agency (EPA) Region VIII approved assessment of Groundwater Under the Direct Influence of Surface Water (GWUDI) was performed at Ansel Watrous Campground. The assessment was performed to determine the probability of GWUDI. All systems receiving 40 points or more are determined to be probable GWUDI systems, and operators must eliminate the risk factors relating to surface water influence, perform a microscopic particulate analysis (MPA) to determine the extent of surface water influence, or comply with the EPA Surface Water Treatment Rule (SWTR) (54 FR 28486, June 29, 1989). If MPA results indicate the existence of a GWUDI system, the system operators must fully comply with the EPA SWTR. The SWTR includes treatment technique requirements for filtered and unfiltered systems that are intended to protect against the adverse health effects of exposure to Giardia lamblia, viruses, and Legionella, as well as many other pathogenic organisms. Those requirements include (1) requirements for maintenance of a disinfectant residual in the distribution system; (2) removal and/or inactivation of 3 log (99.9%) for Giardia and 4 log (99.99%) for viruses; (3) combined filter effluent turbidity performance standard of 5 NTU as a maximum and 0.5 NTU at the 95th percentile monthly, based on 4-hour monitoring for treatment plants using conventional treatment or direct filtration (with separate standards for other filtration technologies); and (4) watershed protection and other requirements for unfiltered systems.

The water source at Spring Creek Campground received the following GWUDI score as totaled below (and as shown in Section F-2):

Well, equal to or greater than 50 feet deep...0
Distance between a surface water source and casing or nearest collector lateral is betw
and 200 feet...5

Total GWUDI Score = 5

D. Potential Sources of Contamination

The following potential sources of contamination were identified at the site:

Potential Source of Contamination	*Distance (ft)*	*Direction*	*Gradient*
Salmon River	160 feet	South	Downgradient
Vault Toilet	115 feet	North	Crossgradient
Spring Creek	100 feet	Northwest	Crossgradient

E. Microscpic Particulate Analysis (MPA) Sampling Event

1. MPA Procedure

The following procedure was followed at Spring Creek Campground for MPA sample collection.
This procedure satisfies sampling requirements for the Consensus Method for Determining Groundwater Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA); EPA 910/9-92-029.

•Samplers raised the handpump off of the well casing without removing or displacing down-hole components.
•Samplers lowered a submersible pump operated by a hand-held generator into the well below the static water level.
•Samplers purged water from the well during the sampling event at a rate no greater than one gallon per minute. Note: samplers recorded pH, conductivity, turbidity, and temperature prior to sampling and upon sampling completion (see Section F-3-C).
•Water was diverted to the ground away from the well after it was passed through the sampling device in a way that minimized surface erosion. Note: surface erosion prevention measures included drainage troughs, plastic sheeting and engineering controls.
•Following sample collection completion, samplers secured the handpump to the top of the well casing.
•The sample filter was placed in a plastic zip-loc bag and wrapped in insulation and an ice pack.

2. MPA Laboratory

The sample was delivered to CH Diagnostic and Consulting Services, Inc. in Loveland, Colorado within 24 hours of collection. CH Diagnostic analyzed the sample filter using the method outlined in EPA manual, Consensus Method for Determining Groundwater Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA); EPA 910/9-92-029. Although CH Diagnostics does not participate in any state or federal certification program because there are currently none available, it does participate in the method review process performed as part of method updates for the industry. In addition, CH Diagnostic was actively involved in the method development process that led to the current approved protocol for microscopic particulates, giardia and cryptosporidium analysis.

The laboratory analytical procedures are compliant with industry approved methodologies. The laboratory uses standardized sample slide reading protocols, random Quality Assurance (QA) officer checks on sample results and/or slide readings, and multiple analytical technicians confirm unknowns. Additionally, an experienced WALSH chemist has reviewed all MPA sample results.

3. MPA Discussion and Results

A microscopic particulate analysis is used to classify a groundwater source as GWUDI based on the detection of certain surface water organisms in the groundwater supply. The presence of these organisms is an indication that the supply is influenced by surface water. Another indication of surface water influence on a groundwater source is if the groundwater turbidities or temperatures rise and fall with changes in the surface water conditions. The extent to

which a groundwater source is influenced by surface water is dependent upon the depth of the well, the type of underlying aquifer, the distance between the groundwater source and a surface water source, the well construction, and the drainage control around the wellhead area.

The water source at Spring Creek Campgroundwas sampled for microscopic particulates at the request of the USDA Forest Service Region 2. The sample filter was analyzed for waterborne particulates and a relative risk was determined based on the following scale:

- >20 = high risk of direct surface water influence
- 10-19 = moderate risk of direct surface water influence
- <9 = low risk of direct surface water influence

If the initial score of an MPA is low, regulating agencies may still require a second MPA test. Additionally, if the score is medium to low, regulating agencies may require annual MPA testing, dye tests, and comparisons of turbidity, pH, conductivity, and temperature between the groundwater source and the nearby surface water. Regulating agencies may also require water treatment (i.e. disinfection) of a groundwater source even if the MPA score is low to medium. However, if the MPA score is high, regulating agencies will require filtration and treatment/disinfection of the groundwater source within 18 months.

The MPA results for the water source at Spring Creek Campground are summarized in Table E-1. Detailed laboratory results, including specific particulate detects are attached in Section F-3-B.

Table E-1: MPA Results Summary

Sample ID	Sample Date/Time	Volume Purged (gallons)	Sample Information	MPA Score
0001.000017	6/13/2005 10:15:00 AM to 6/13/2005 8:50:00 PM	579.4 Gallons	pH = 7.1 to 7.03 Temp. = 13.3°C to 10.4°C Turb. = 0 NTU to 0 NTU Cond. = pCi/L to pCi/L	0

°C = degrees Celsius
ft. = feet
pCi/L = picocuries per liter
Cond. = conductivity
ID = identification
MPA = microscopic particulate analysis
NTU = nephelometric turbidity unit
Temp. = temperature
Turb. = turbidity

The MPA score for the water source was determined based on relative risk factors associated with the presence of primary bio-indicators (particulates). Table E-2 summarizes the numerical range of each particulate associated with surface water influence counted per 100 gallons of water, and indicates the significance of the number counted (i.e. extremely heavy, heavy, moderate, rare, or not significant). Table E-3 lists the relative risk factors associated with the number of each particulate counted.

Table E-2: Numerical Range of Each Primary Bio-Indicator Counted Per 100 Gallons Water

Indicators of Surface Water	EH	H	M	R	NS
Giardia	>30	16-30	6-15	1-5	<1
Coccidia	>30	16-30	6-15	1-5	<1
Diatoms	>150	41-149	11-40	1-10	<1
Other Algae	>300	96-299	21-95	1-20	<1
Insects/Larvae	>100	31-99	16-30	1-15	<1
Rotifers	>150	61-149	21-60	1-20	<1
Plant Debris	>200	71-200	26-70	1-25	<1

EH = extremely heavy
H = heavy
M = moderate
R = rare
NS = not significant

Table E-3: Primary Bio-Indicators and Associated Risk Factors

Indicators of Surface Water	Relative Risk Factor				
	EH	H	M	R	NS
Giardia	40	30	25	20	0
Coccidia	35	30	25	20	0
Diatoms	16	13	11	6	0
Other Algae	14	12	9	4	0
Insects/Larvae	9	7	5	3	0
Rotifers	4	3	2	1	0
Plant Debris	3	2	1	0	-

EH = extremely heavy
H = heavy
M = moderate
R = rare
NS = not significant

The MPA results for this water sources are scored as follows:

Particulate detects (see Section F-3-B for laboratory MPA results).

Algae = 0/100 gallons
Diatoms = 0/100 gallons
Plant Debris = 0/100 gallons
Rotifers = 0/100 gallons
Nematodes= 0/100 gallons
Pollen (pine) = 0/100 gallons
Ameba = 0/100 gallons
Ciliates = 40/100 gallons
Colorless Flagellates = 0/100 gallons
Crustaceans = 0/100 gallons
Other Arthropods = 0/100 gallons
Other = Highest value was recorded from results of two MPA.
Amorphous Debris = inorganic precipitate, clay (1-2 micrometers), silt (2-50 micrometers), aggregates

From Tables E-2 and E-3, the MPA Score for this site is:

0 - Low Risk per EPA Consensus Method

F. Bacteriological and Chemical Well Water Sampling Event and Results

1. Water Analysis Sampling Procedure

The following procedure was followed at Spring Creek Campground for bacteriological and chemical well water sample collection.

This procedure satisfies sampling requirements as specified by Design Water Technologies.

- Samplers collected samples prior to performing an MPA to ensure that casing water can be captured.
- Samplers raised the handpump off of the well casing without removing or displacing down-hole components using a tripod and wench pulley system.
- Samplers lowered a submersible pump operated by a generator into the well below the static water level.
- Samplers pumped water from the well at one to two gallons per minute, collecting the first set of water samples after 90 seconds and the second set of water samples after one hour. Samples to be analyzed by microbiology were collected in separate containers from the samples to be analyzed by chemistry; and samples were labeled accordingly.
- Water was diverted to the ground away from the well after it is pumped in a way that will minimize surface erosion. Note: surface erosion prevention measures include drainage troughs, plastic sheeting and engineering controls.
- Laboratory supplied sample containers (300-500 mL plastic bottles) were used for collection of the water samples.
- Following sample collection completion, samplers labeled the location, time, and date. The samples were placed in a plastic zip-loc bag and wrapped in insulation and an ice pack prior to shipment to Idaho State Bureau of Labs. Each sample was labeled for testing as required.
- Following completion of sampling event, samplers lowered and secured the handpump to the top of the well casing.

2. Water Analysis Laboratory

The samples were delivered to Idaho State Bureau of Labs in Boise, Idaho within 24 hours of collection. The laboratory analyzed the samples using Standard Method 9223

for Total Coliform and E. coli; Method ICP 200.7 for iron; and EPA Method 150.1 for pH.

The following is a summary of the method procedure for Standard Method 9223 for total coliform and E. coli. A specified volume of sample (typically 100 mL) is mixed with commercially prepared enzyme substrates and incubated at 35 +/- 0.5 C. Beta-galactosidase, an enzyme produced by total coliforms, is detected by hydrolysis of the chromogenic substrates ONPG (ortho-nitrophenyl-beta-D-galactopyranoside) and CPRG (chlorophenol red-beta-D-galactopyranoside). Beta-glucuronidase, an enzyme produced by E. coli, is detected by hydrolysis of the fluorescent substrate MUG (4-methylumbelliferyl-beta-D-glucuronide). Hydrolyzed ONPG is seen as a yellow color after incubation for 24 to 28 hours; hydrolyzed CPRG is seen as a red or magenta color after incubation for 28 to 48 hours - either condition is positive for total coliforms. No color from ONPG, or a yellow color from CPRG, is negative for total coliforms. Hydrolyzed MUG is seen as blue fluorescence when viewed under long-wavelength (366-nm) ultraviolet light, indicating a positive test for E. coli.

The following is a summary of the method procedure for ICP Method 200.7 for iron. For the determination of total recoverable iron in aqueous samples containing particulate material as well as solid wastes, samples are subjected to acid pretreatment with nitric and hydrochloric acids and gentle refluxing prior to analysis. The method involves multi-element determination using sequential or simultaneous instruments. The instruments measure characteristic atomic-line emission spectra by optical spectrometry. Sample solutions are nebulized and the resulting aerosol is transported to the plasma torch. Element specific emission spectra are produced by a radio-frequency inductively coupled plasma. The spectra are dispersed by a grating spectrometer and the intensities of the lines are monitored at specific wavelengths by a photosensitive device. Photocurrents from the photosensitive device are processed and controlled by a computer system. A background correction technique is required to compensate for variable background contribution to the determination of the analyte.

The pH of a sample is determined electrometrically using either a glass electrode in combination with a reference potential or a combination electrode.

3. Water Analysis Discussion and Results

The water analysis results for the water source are summarized in Table F-1. Detailed laboratory results are attached in Section G-3-B.

EPA Method 9223B is approved for detecting the presence/absence of total coliforms and E. coli in drinking water. The purpose of this analysis is for compliance with national primary and secondary drinking water regulations. The following are the applicable concentration ranges: for samples in wells (excluding dilution factors), using IDEXX Colilert or Colisure kits: 1 to 2419 MPN/100 mL for 97-well Quanti-Tray; and 1 to 200 MPN/100 mL for 51-well Quanti-Tray.

The ICP Method 200.7 method determines iron, in the dissolved fraction of aqueous samples and measures the total-recoverable analytes in water, wastewater, and solid wastes. Total-recoverable determination data for aqueous samples is reported as total (dissolved + suspended fractions) metal data.

The EPA Method 150.1 determines the pH of drinking, surface and saline water; and domestic and industrial wastes and acid rain (atmospheric deposition).

Table F-1: Water Analysis Results Summary

Spring Creek	Result 1 **date:** 06/13/05 **time:** 08:50	Result 2 **date:** 06/13/05 **time:** 09:50
Total Coliform	< 1 / 100 mL	< 1 / 100 mL
E. Coli	< 1 / 100 mL	< 1 / 100 mL
Iron	15 mg/L	0.46 mg/L
pH	6.5	6.6

mL = milliliters
mg/L = milligrams per liter

F. Attachments

1. System Construction Information

2. Groundwater Under the Direct Influence of Surface Water (GWUDI) Evaluation

3. Microscopic Particulate Analysis Sampling Event
A. Apparatus
B. Results
C. Field Notes and Database Forms

4. Maps and/or Site Plan

5. Photographs

1. System Construction Information

No System Construction Information

was available for this site.

2. Groundwater Under the Direct Influence of Surface Water (GWUDI) Evaluation

Walsh
Environmental Scientists and Engineers, LLC

System CN: 0001.000017

United State Environmental Protection Agency, Region 10
Idaho Operations Office

ASSESSMENT OF GROUND WATER UNDER THE DIRECT INFLUENCE OF SURFACE WATER AND SUBJECT TO THE SURFACE WATER TREATMENT RULE

A. Type of Subsurface Water Source (Check Only One)

- [x] Well, equal to or greater than 50 feet deep...0
- [ ] Well, less than 50 feet deep or no well log available...5
- [ ] Spring...10
- [ ] Infiltration Gallery...10

B. Historical Microbiological Contamination (Check all that apply)

- [ ] History or suspected outbreak of Giardia or other pathogenic organisms associated with surface water with current system configuration...50
- [ ] Record of total coliform acute MCL violations over last 3 years...30

Record of total coliform monthly MCL violations over last 3 years

- [ ] One month...5
- [ ] Two months...10
- [ ] Three months...20

- [ ] Regulatory agency verifies complaints about turbidity or suspected waterborn disease...10

C. Hydrogeological Features (Check all that apply)

Distance between a surface water source and casing or nearest collector lateral

- [ ] Over 200 feet...0
- [x] 100-200 feet...5
- [ ] Less than 100 feet...10

- [ ] Intake is located on floodplain at approximate altitude of stream...20
- [ ] Surface runoff drains toward intake...15
- [ ] Exposed aquifer that is coarse alluvial, cavernous, or fractuered is used for water supply...15

D. Water Intake Structure (Check all that apply)

- [ ] Poorly constructed well, or spring collection chamber (uncase, or casing not cemented to depth of at least 20 feet below land surface)...15
- [ ] Poor sanitary seal, or seal without acceptable material...15
- [ ] Intake open to atmosphere...15
- [ ] Leaks of source collector that allow entry of surface water...15

Remarks: No test results or well log available for review.

An MPA is required for all sites scoring 40 points or more.

Total GWUDI Score = 5

3. Microscopic Particulate Analysis Sampling Event

A. Apparatus

EQUIPMENT

1. Inlet hose (washing machine hose)
2. Backflow preventor (BP) (not included because air gap at effluent)
3. Pressure regulator (PR)
4. Pressure gauge (PG)
5. Filter housing (H) Fulflo LT10
6. 1 micron nominal porosity filter (F) Parker Hannifan M39R10A
7. Meter (M)
8. Limiting flow orifice (LFO) 3.785 L/min. (1 gal/min)

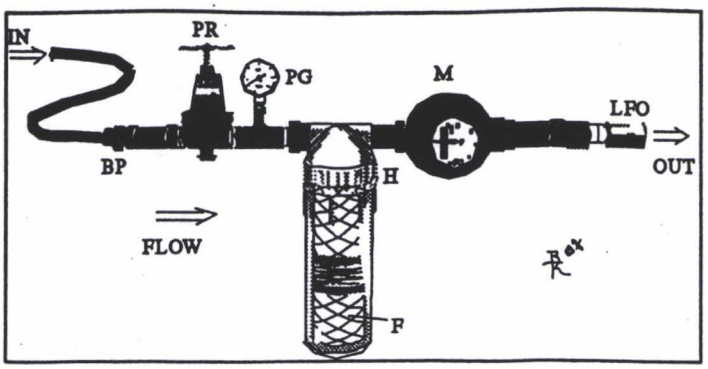
Additional Equipment for chlorinated samples:

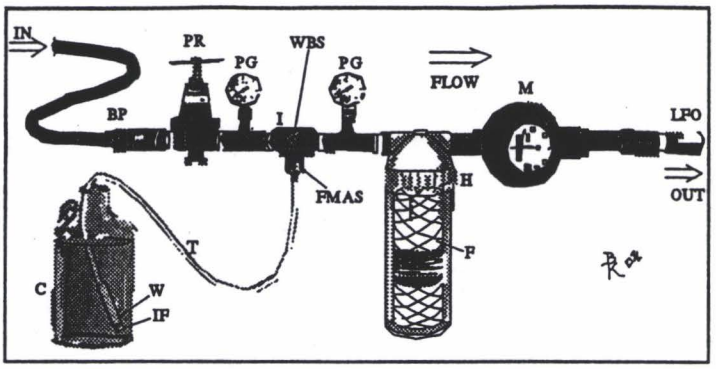
9. Large sanitary container (C) for sodium thiosulfate solution
10. Injector (I) with:
    a. water bypass screw (WBS)
    b. Fine metering adjustment screw (FMAS)
    c. tubing (T)
    d. injector filter (IF)
    e. porcelain weight (W)
11. Second pressure gauge

Equipment on loan from CH Diagnostic is clean and ready to use. Otherwise, clean equipment thoroughly before use.

OTHER SUPPLIES

(1) Turbidimeter (optional); (2) pH meter (optional); (3) Thermometer (optional); (4) Sanitary latex gloves; (5) Heavy duty zip-loc 1 gallon freezer bags; (6) Frozen ice packs and cooler for shipping; (7) For chlorinated water: sodium thiosulfate and distilled water or sample water (see page 2); (8) For non-pressurized source: 2-4 Liter/minute gas or electric pump.





Example of a Meter Reading						
Meter Reading						
0	**0**	**0**	**2**	**5**	**3**	**0**
1,000,000 gallon mark	100,000 gallon mark	10,000 gallon mark	1,000 gallon mark	100 gallon mark	10 gallon mark	This digit remains zero, read the gallons from the red meter hand.
This meter reads 2,530. If the red meter hand is on the 4, then it reads 2,534.						

B. Results

ANALYSIS FOR WATERBORNE PARTICULATES

Invoice 20050463

CH Diagnostic and Consulting Service, Inc.
214 SE 19th Street, Loveland, CO 80537
Brec L. Clay, President/Treasurer; Gregory D. Sturbaum, President/Secretary
(970) 667-9789

Customer 20031455
Walsh Environmental
4888 Pearl E. Circle, Suite 108
Boulder, CO 80301

Laboratory Information
Postal Express; 6/16/2005; 1035 Hrs; 20.8°C; Wound
Results submitted by:

Sample Identification: Spring Creek CG, #1, 0001.000017

Sample Information: SOURCE: Drilled Well; 100' from surface water; Unchlorinated; pH 7.1 —» pH 7.03; 13.3°C —» 10.4°C

Sample Date & Time: 6/13/2005 10:15 AM —» 6/13/2005 08:50 PM **Sampler:** Z. Ross/A. Walsh

Amount: 2193.029 L (579.4 gal) **Filter Color:** Light rust **Filter Type:** Polypropylene wound cartridge

Date/Time Eluted: 6/16/2005 01:08 PM **Centrifugate:** 0.0821 mL/100 L

RESULTS OF MICROSCOPIC PARTICULATE ANALYSIS

Amount of sample assayed: 9.5 L

Amorphous Debris	inorganic precipitate, clay (1-2 µm), silt (2-50 µm), aggregates
Algae	ND
Diatoms	ND
Plant debris	ND
Rotifers	ND
Nematodes	ND
Pollen (pine)	ND
Ameba	ND
Ciliates	40/100 Gal
Colorless Flagellates	ND
Crustaceans	ND
Other Arthropods	ND
Other	ND

Giardia and Coccidia are none detected (ND) by MPA unless reported under "Other".

This sample was analyzed for particulates following the Environmental Protection Agency Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA). 1992. USEPA, Port Orchard, WA, EPA 910/9-92-029. All limitations stated in the methods apply. If HV capsule or foam filter was received, method was modified by filtering sample through a Pall Envirochek™ HV capsule or IDEXX Filta-Max™ filter at the sample site. If *Giardia* and *Cryptosporidium* Analysis was also performed, particulate extraction was modified.

COMMENTS: Score: 0-Low Risk per EPA Consensus Method referenced above.

ANALYSIS FOR WATERBORNE PARTICULATES

Invoice 20050463

CH Diagnostic and Consulting Service, Inc.
214 SE 19th Street, Loveland, CO 80537
Brec L. Clay, President/Treasurer; Gregory D. Sturbaum, President/Secretary
(970) 667-9789

Customer 20031455
Walsh Environmental
4888 Pearl E. Circle, Suite 108
Boulder, CO 80301

Laboratory Information
Postal Express; 6/16/2005; 1035 Hrs; 20.6°C; Wound
Results submitted by:

Sample Identification: Spring Creek CG, #2, 0001.000018

Sample Information: SOURCE: Drilled Well; 100' from surface water; Unchlorinated; pH 7.2 —» pH 7.02; 12.8°C —» 11.6°C

Sample Date & Time: 6/13/2005 10:15 AM —» 6/13/2005 08:50 PM **Sampler:** A. Walsh/Z. Ross

Amount: 2088.942 L (551.9 gal) **Filter Color:** Light rust **Filter Type:** Polypropylene wound cartridge

Date/Time Eluted: 6/16/2005 03:40 PM **Centrifugate:** 0.0144 mL/100 L

RESULTS OF MICROSCOPIC PARTICULATE ANALYSIS

Amount of sample assayed: 160 L

Amorphous Debris	silt (2-50 µm), clay (1-2 µm), inorganic precipitate
Algae	ND
Diatoms	ND
Plant debris	ND
Rotifers	ND
Nematodes	ND
Pollen (pine)	ND
Ameba	ND
Ciliates	ND
Colorless Flagellates	ND
Crustaceans	ND
Other Arthropods	ND
Other	ND

Giardia and Coccidia are none detected (ND) by MPA unless reported under "Other".

This sample was analyzed for particulates following the Environmental Protection Agency Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA). 1992. USEPA, Port Orchard, WA, EPA 910/9-92-029. All limitations stated in the methods apply. If HV capsule or foam filter was received, method was modified by filtering sample through a Pall Envirochek™ HV capsule or IDEXX Filta-Max™ filter at the sample site. If *Giardia* and *Cryptosporidium* Analysis was also performed, particulate extraction was modified.

COMMENTS: Score: 0-Low Risk per EPA Consensus Method referenced above.

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Boise Laboratory
2220 Old Penitentiary Road, Boise, Idaho 83712
ENVIRONMENTAL/RECREATIONAL SAMPLE REPORT

LAB: BOISE, Phone: (208) 334-2235
Section Manager, Bacteriology: Robert Chehey

LAB #
ID00018

WALSH ENVIROMENTAL
ALLISON HAINES
4888 PEARL EAST CR ST 108
BOLDER, CO 80301

Tracking Number: 40605-2084/
(Please Refer to this Tracking Number on any communications)

Storet:
NPDES Number:
Matrix: WATER
Sample Location: SPRING CREEK CG 06-13-05-M1
Type of Sample:
Sample Taken From: Unknown - U
Collected by: WALSH
Preservation: Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 06/13/05 Date Received in Lab: 06/14/05
Time Collected: 08:50 Time Received in Lab: 11:00

TEST CODE		RESULTS	COMPLETED
EQT	TOTAL COLIFORM	<1 /100 ml.	06/15/05
EQM	E. COLI	<1 /100 ml.	06/15/05

RICHARD F. HUDSON Ph.D.
BUREAU CHIEF
IDAHO BUREAU OF LABORATORIES

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Boise Laboratory
2220 Old Penitentiary Road, Boise, Idaho 83712
ENVIRONMENTAL/RECREATIONAL SAMPLE REPORT

LAB: BOISE, Phone: (208) 334-2235
Section Manager, Bacteriology: Robert Chehey

LAB #
ID00018

WALSH ENVIROMENTAL
ALLISON HAINES
4888 PEARL EAST CR ST 108
BOLDER, CO 80301

Tracking Number: 40605-2085/
(Please Refer to this Tracking Number on any communications)

Storet:
NPDES Number:
Matrix: WATER
Sample Location: SPRING CREEK CG 06-13-05-M2
Type of Sample:
Sample Taken From: Unknown - U
Collected by: WALSH
Preservation: Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 06/13/05 Date Received in Lab: 06/14/05
Time Collected: 09:50 Time Received in Lab: 11:00

TEST CODE		RESULTS	COMPLETED
EQT	TOTAL COLIFORM	<1 /100 ml.	06/15/05
EQM	E. COLI	<1 /100 ml.	06/15/05

RICHARD F. HUDSON Ph.D.
BUREAU CHIEF
IDAHO BUREAU OF LABORATORIES

IDAHO DEPARTMENT OF
HEALTH & WELFARE

DIRK KEMPTHORNE – Governor
KARL B. KURTZ – Director

BUREAU OF LABORATORIES
RICHARD F. HUDSON, Ph.D., Chief
2220 Old Penitentiary Road
Boise, ID 83712
PHONE 208-334-2235
FAX 208-334-2382

Walsh Environmental
Attention: Allison Haines
4888 Peral E. Circle
Suite 108
Boulder, CO 80301

Laboratory Order ID
061405_03
(Please refer to this number when contacting the lab)

Customer ID:	WalshEnviro	**Date Collected:**	6/13/2005
Project ID:	Campground	**Time Collected:**	8:50 AM
Site:	Campground	**Date/Time Received:**	6/14/2005
Matrix:	Drinking Water	**Collected By:**	Zane Ross

Customer Sample ID: Spring Creek Campground 06-13-05-C1 **Lab Sample Number:** 0506 294

Test	Method	Result	Units	Analysis Date	Analyst
Digestion	EPA 3005A	Done	N/A	6/14/2005	J.Stransky
Iron, Total	EPA 200.7	15	mg/L	6/16/2005	J.Stransky
pH	EPA 150.1	6.5	pH Units	6/14/2005	A.Bishop

Laboratory Supervisor

IDAHO DEPARTMENT OF
HEALTH & WELFARE

DIRK KEMPTHORNE – Governor
KARL B. KURTZ – Director

BUREAU OF LABORATORIES
RICHARD F. HUDSON, Ph.D., Chief
2220 Old Penitentiary Road
Boise, ID 83712
PHONE 208-334-2235
FAX 208-334-2382

Walsh Environmental
Attention: Allison Haines
4888 Peral E. Circle
Suite 108
Boulder, CO 80301

Laboratory Order ID
061405_03
(Please refer to this number when contacting the lab)

Customer ID:	WalshEnviro	**Date Collected:**	6/13/2005
Project ID:	Campground	**Time Collected:**	9:50 AM
Site:	Campground	**Date/Time Received:**	6/14/2005
Matrix:	Drinking Water	**Collected By:**	Zane Ross

Customer Sample ID: Spring Creek Campground 06-13-05-C2 **Lab Sample Number:** 0506 293

Test	Method	Result	Units	Analysis Date	Analyst
Digestion	EPA 3005A	Done	N/A	6/14/2005	J.Stransky
Iron, Total	EPA 200.7	0.46	mg/L	6/16/2005	J.Stransky
pH	EPA 150.1	6.6	pH Units	6/14/2005	A.Bishop

Laboratory Supervisor

DRINKING WATER ANALYSIS REQUEST FORM (NON PWS SAMPLE)

PLEASE COMPLETE **ALL** INFORMATION TO ENSURE COMPLIANCE CREDIT

Customer / Agency Name: Allison Haines / Walsh Environmental		
Address: 4888 Pearl East Circle Suite 108		
City: Boulder	**State:** CO	**Zip:** 80301
Attention: Allison Haines	**Phone:** 303-443-3282	
Email Address: ahaines@walshenv.com	**Fax:** 303-443-0367	
Collectors Name (if different than above): Zane Ross	**Contact Phone #:**	
Collection Date: 6-13-05	**Collection Time:** (24 hour clock) 9:50	
Sample ID / MS # / DC#: SpringCreek-CG-06-13-05-C1	**Sample Location:** Spring Creek campground	

Idaho Bureau of Laboratories
2220 Old Penitentiary Rd.
Boise, ID 83712
208-334-2235
EPA No. ID00018

Inorganic

☐ Alkalinity	☐ Chloride	☑ Iron (Turb MC)	☐ Selenium
☐ Aluminum	☐ Chromium	☐ Lead	☐ Silica
☐ Ammonia as N	☐ Conductivity	☐ Magnesium	☐ Silver
☐ Antimony	☐ Copper	☐ Manganese	☐ Sodium
☐ Arsenic	☐ Corrosivity	☐ Nickel	☐ Sulfate
☐ Barium	☐ Cyanide	☐ Nitrate as N	☐ Surfactants
☐ Beryllium	☐ Fluoride	☐ Nitrite as N	☐ Thallium
☐ Cadmium	☐ Hardness	☑ pH	☐ Total Dissolved Solids
☐ Calcium	☐ Hydrogen Sulfide	☐ Potassium	☐ Zinc

Radiology

☐ Gross Alpha/Beta ☐ Gross Alpha ☐ Gross Beta ☐ Uranium
☐ Radium 226 ☐ Radium 228 ☐ Other _____

Organics

☐ **VOC's** - EPA 524.2 ☐ THM's – EPA 524.2 ☐ TTHM - EPA 524.2 ☐ HAA5 – EPA 552.2

SOC's

☐ Carbamates – EPA 531.1
☐ Chlorinated Pesticides - EPA 508.1
☐ Diquat – EPA 549.2
☐ EDB & DBCP – EPA 504.1
☐ Endothall – EPA 548
☐ Glyphosate – EPA 547
☐ Herbicides – EPA 515.1
☐ Semi-Volatiles – EPA 525.2

COPY

Additional Testing and/or Comments: Iron, method ICP MS 200.8 and EPA Method 150.1 for pH

LABORATORY USE ONLY

Lab Order ID: ~~6-294~~ 6-294 Temperature: 1.4°C Shipper: Express Mail Container Type: cold

Number of Bottles / Sample: 2 Number of Samples / Order: 4 Preservative(s): neat / HNO_3

Date Received: 6-14-05 Received By: LC Lab Sample #: 6-294

Revised 042605

061405-03

DRINKING WATER ANALYSIS REQUEST FORM (NON PWS SAMPLE)

PLEASE COMPLETE **ALL** INFORMATION TO ENSURE COMPLIANCE CREDIT

Customer / Agency Name: Allison Haines, Walsh Environmental		
Address: 4888 Pearl E. Circle Suite 108		
City: Boulder	**State:** CO	**Zip:** 80301
Attention: Allison Haines	**Phone:** 303-443-3282	
Email Address: ahaines@walshenv.com	**Fax:** 303-443-0367	
Collectors Name (if different than above): Zane Ross	**Contact Phone #:**	
Collection Date: 6-13-05	**Collection Time:** (24 hour clock) 9:50	
Sample ID / MS # / DC# Spring Creek CG 06-13-05-C2	**Sample Location:** Spring Creek campground	

Idaho Bureau of Laboratories
2220 Old Penitentiary Rd.
Boise, ID 83712
208-334-2235
EPA No. ID00018

Inorganic

☐ Alkalinity	☐ Chloride	☑ Iron	☐ Selenium
☐ Aluminum	☐ Chromium	☐ Lead	☐ Silica
☐ Ammonia as N	☐ Conductivity	☐ Magnesium	☐ Silver
☐ Antimony	☐ Copper	☐ Manganese	☐ Sodium
☐ Arsenic	☐ Corrosivity	☐ Nickel	☐ Sulfate
☐ Barium	☐ Cyanide	☐ Nitrate as N	☐ Surfactants
☐ Beryllium	☐ Fluoride	☐ Nitrite as N	☐ Thallium
☐ Cadmium	☐ Hardness	☑ pH	☐ Total Dissolved Solids
☐ Calcium	☐ Hydrogen Sulfide	☐ Potassium	☐ Zinc

Turb ME

Radiology

☐ Gross Alpha/Beta ☐ Gross Alpha ☐ Gross Beta ☐ Uranium
☐ Radium 226 ☐ Radium 228 ☐ Other _____

Organics

☐ **VOC's** - EPA 524.2 ☐ THM's – EPA 524.2 ☐ TTHM - EPA 524.2 ☐ HAA5 – EPA 552.2

SOC's

☐ Carbamates – EPA 531.1
☐ Chlorinated Pesticides - EPA 508.1
☐ Diquat – EPA 549.2
☐ EDB & DBCP – EPA 504.1
☐ Endothall – EPA 548
☐ Glyphosate – EPA 547
☐ Herbicides – EPA 515.1
☐ Semi-Volatiles – EPA 525.2

COPY

Additional Testing and/or Comments: Iron Method ICP MS 200.8 and EPA method 150.1 for pH

LABORATORY USE ONLY
Lab Order ID: 6-293 Temperature: <4 C Shipper: Xpress Mail Container Type: cubi
Number of Bottles / Sample: 2 Number of Samples / Order: 4 Preservative(s): nc. t / H2O2
Date Received: 6.14.05 Received By: LL Lab Sample #: 6-293
Revised 042605

061405-03

C. Field Notes and Database Forms

Microscopic Particulate Analysis
Field Data
Region - 04

Forest	Salmon-Challis	Code:	04
Water System Name:	Spring Creek Campground		
District:	North Fork		
County:	Lemhi	Date Sampled:	06/13/2005

System CN:	0001.000017		
Additional ID #1:		Type:	
Additional ID #2:		Type:	
Real Property Number:			

MPA - Field Data

1. General Site Information
2. Contacts/Escorts
3. Short Survey
4. Well Log Information
5. GPS and Photographs
6. Sample Information
7. Field Notes

MPA-Field Data

System CN: 0001.000017

1. General Information

Type of Site:	Recreation	Classification:	transient, non-community (TNC)
Type of system:	well with handpump	Currently in use:	Yes
Year of installation:	Unknown		

Approximate number of people per day using site: Unknown

Site opened annually from April to November

Location: Approximately 12 miles west of North Fork, Idaho

Remarks: None

System CN: 0001.000017

2. Contacts/Escorts

Forest Service Contact:	None		
Title:	Not Applicable		
Was sampling appointment scheduled in advance?	Yes	Method of Scheduling:	Phone

Additional Individuals Present During MPA: None

Campers / Recreational Individuals Present During MPA: Yes

Remarks: None

System CN: 0001.000017

MPA - Field Data

3. Short Survey

Spring

Spring Type: | Spring Capacity: 0 gpm | ☐ Adequate Fence | ☐ Adequate Lid

Spring Improvements:

Well

☑ Casing is 12" above natural grade ☑ Concrete slab is present

Improvements: Add a permanent "No Washing/No Bathing" sign

Pump

☑ Handpump ☐ Submersible Pump ☐ Supply Pump

☐ Adequate Pump Protection ☐ Adequate Pump Protection

Improvements: None

Treatment

Disinfection Type: Not Applicable ☐ Sedimentation ☐ Filtration

Improvements:

Storage

☐ Hydropneumatic	☐ Below Ground	☐ Above Ground
Number: 0	Number: 0	Number: 0
Capacity: 0 Gallons	Capacity: 0 Gallons	Capacity: 0 Gallons

Improvements:

System CN: 0001.000017

MPA - Field Data

3. Short Survey Continued

Distribution Line

Material: Not Applicable

Approximate Length: 0 Feet

Number of Connections: 0

Number of Drains: 0

Improvements:

Power Supply

Power Supply Type: Not Applicable

Improvements:

Potential Sources of Contamination

Salmon River approximately 160 feet south and down gradient of the handpump, Spring Creek approximately 100 feet northwest and cross gradient of the handpump and a vault toilet approximately 115 feet north and cross gradient of the handpump

Remarks: None

MPA - Field Data

System CN: 0001.000017

4. Well Log Information

☐ Spring

Well

Well Permit Number: Unknown
Driller Name: Unknown
Well Log: Unknown
Phone:
Year Drilled:
License #: Unknown
Section: 16
Township: 24 N
Range: 19 E
Type: Drilled

Casing
Diameter: 7 inches
Material: Steel
Wall Thickness: 1/2 in Inches

Depth
Ground surface to bottom of well: Unknown Feet
Ground surface to bottom of casing: Unknown Feet
Ground surface to first draw: Unknown Feet
Screen Interval From: 0 to: 0 Feet Below Ground Surface

Static water level: feet below ground surface
Capacity: (gpm) Unknown at Unknown feet drawdown:
Type of sanitary seal: Cement Grout

Well Screen
Well Screen Material: Unknown
Sanitary Cover Type: Handpump
Vented: Yes
Pitless Adapter: Not Applicable

Remarks: None

MPA- Field Data

System CN: 0001.000017

5. GPS and Photographs

GPS

Latitude: 45 Degrees 23 Minutes ☑ N ☐ S Elevation: 3406 Feet

Longitude: 114 Degrees 15 Minutes ☐ E ☑ W Accuracy: 29 Feet

Object / Location Being Mapped: Well

Type of GPS Equipment: Hand-held Garmin Etrex Venture

Equipment Problems: None

Comments: None

Photographs

☐ Photographs Were Taken

Description of Photographs:

Remarks:

MPA-Field Data

System CN: 0001.000017

6. Sample Information

Primary Sample

Volume Sampled: 579.4 Gallons

Sample Identification Number: 0001.000017

Start Date: 6/13/2005
Start Time: 10:15:00 AM
Stop Date: 6/13/2005
Stop Time: 8:50:00 PM

Analyses
- [x] Analyze by Method Number EPA 910/9-92-029
- [ ] Add Giardia and Cryptosporidium
- [ ] Sampled water was chlorinated

Initial Parameters			Final Parameters		
ph:	7.1		pH:	7.03	
Temperature:	13.3	C	Temperature:	10.4	C
Turbidity:	0	NTU	Turbidity:	0	NTU
Conductivity:		pCi/L	Conductivity:		pCi/L

Field Duplicate Sample

- [x] Field Duplicate Taken at this site

Volume Sampled: 551.9 Gallons

Field Duplicate Identification Number: 0001.000018

Start Date: 6/13/2005
Start Time: 10:15:00 AM
Stop Date: 6/13/2005
Stop Time: 8:50:00 PM

Analyses
- [x] Analyze by Method Number EPA 910/9-92-029
- [ ] Add Giardia and Cryptosporidium
- [ ] Sampled water was chlorinated

Initial Parameters			Final Parameters		
pH:	7.2		pH:	7.02	
Temperature:	12.8	C	Temperature:	11.6	C
Turbidity:	0	NTU	Turbidity:	0	NTU
Conductivity:		pCi/L	Conductivity:		pCi/L

All Samples

Report Results To: Allison Haines

Method of Sample Delivery: Courier

- [ ] Rush Analyses (Quick Turn-around)

Special Instructions: None

Remarks: Two samples were taken at the same time for this campground. Sample #1 is the 'primary' and #2 is the 'duplicate' but each is considered a seperate MPA.

Laboratories

System CN: 0001.000017

Laboratory: CH Diagnostics

Laboratory Address: CH Diagnostics 214 19th Street Loveland, Colorado 80537

Remarks: None

MPA - Field Data

System CN: 0001.000017

7. Field Notes

Field Notes: The sampling event had no problems and samplers were able to sample the well without any malfunctions of the equipment. A one hour test was also performed at this site.

4. Map and/or Site Plan

SYMBOLS FOR FIELD SKETCHES

SOURCES

⊕ SUB	Indicates a well source with a submersible pump
⊕ HP	Indicates a well source with a handpump
⊕ SPR	Indicates a spring source
⊕ SUR	Indicates a surface source
⊕ MUN	Indicates a municipal source

PUMPS

X SUB	Indicates a submersible pump
X SUP	Indicates a supply pump

TREATMENT

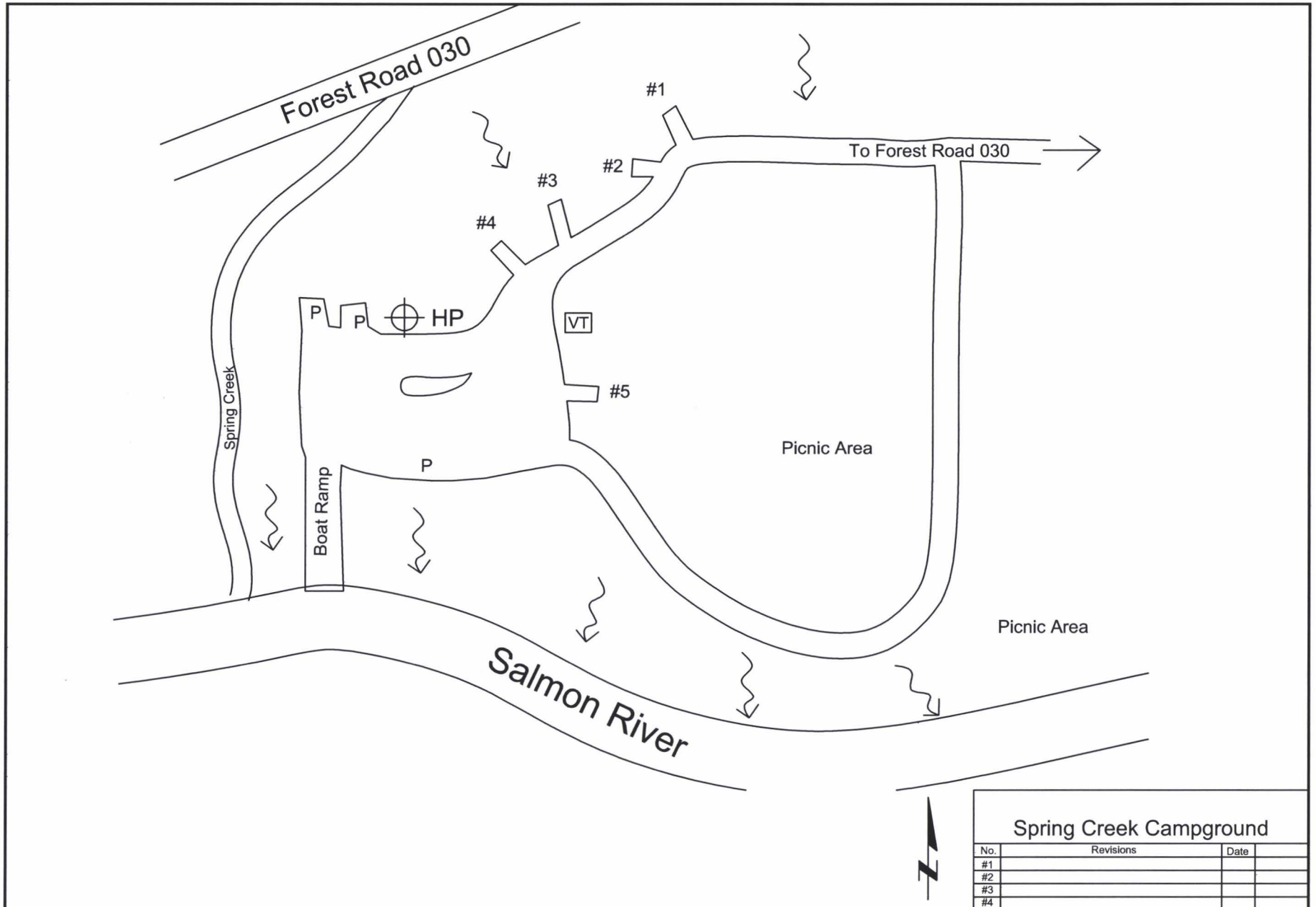
+ CL	Indicates a chlorine treatment system
+ ID	Indicates a iodine treatment system
+ OZ	Indicates an ozone treatment system
+ FIL	Indicates a filtration system

STORAGE

■ HYD	Indicates a hydropneumatic storage tank
■ ELEV	Indicates an elevated storage tank
■ BG	Indicates a below ground storage tank
■ OTHER	Indicates another type of storage tank

DISTRIBUTION AND POINT OF USE

△1	Indicates drain number 1, 2, 3, 4, etc.
Ⓟ1	Indicates point of use number 1, 2, 3, 4, etc.
——	Indicates verified distribution line
-------	Indicates estimated distribution line



Spring Creek Campground

No.	Revisions	Date
#1		
#2		
#3		
#4		

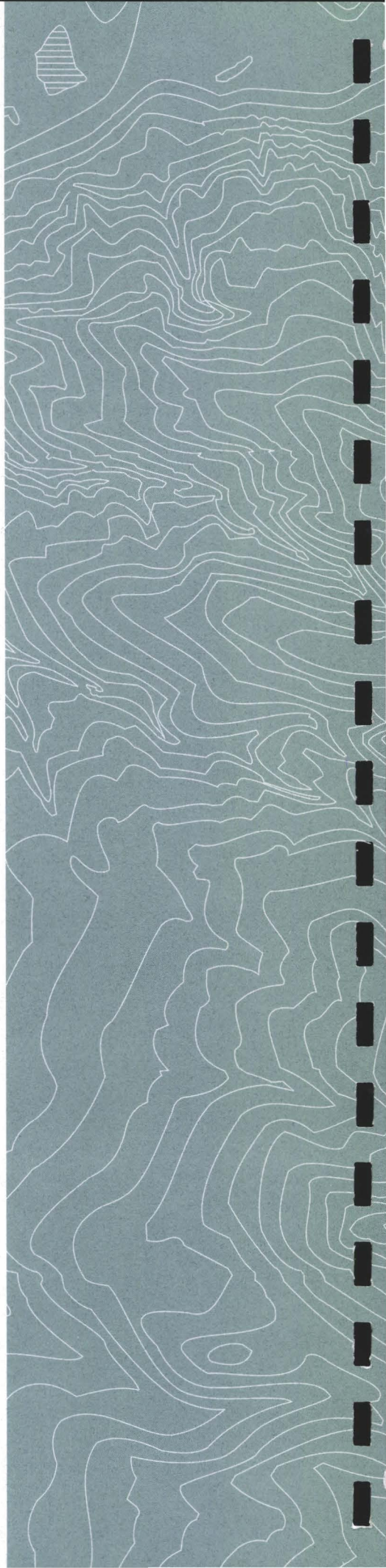
Walsh
Environmental Scientists and Engineers, LLC

USDA FOREST SERVICE
MPA

P: projects\USFS\MPA\Reports\

CREATED BY FIELD SKETCH:
NOT TO SCALE

Date: 6/23/05	Drawn By: A. Walsh
Project No. 6137-010	Checked By: Allison Haines
Figure: 1	1 1



Walsh

Environmental Scientists and Engineers, LLC

Corporate Headquarters: Boulder, Colorado
Grand Junction, Colorado
Colorado Springs, Colorado
Fort Collins, Colorado
Quito, Ecuador
Lima, Peru